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Why Does Education Pay-Off in Rural Areas? Evidence from Rural Chinese Counties, 1988-2002

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Abstract

More education among individuals has been related to gains in their incomes. This paper develops a simple model to disentangle the effect of education on incomes by considering two possible venues: an impact on resource allocation (labour and capital) from less to more productive sectors as well as increases in productivity. The model predicts that education increases the ability of households to allocate resources so that the more educated households allocate more (labour and capital) to productive sectors. The paper estimates household net income functions using data from the China Household Income Project (CHIP) for the 1988, 1995 and 2002, which cover a period of substantial economic reforms in China. The results show that education influences household allocation in a pooled cross-section of households. Increases in education from the junior high school level to the university level results in an 18.8 percent increase in per capita net household income. Of this, 7.6 percent and 1.4 percent comes respectively from the labour and capital allocation towards the non-agricultural sector, and 9.8 percent comes from productivity gains.

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I. Introduction

More education is highly correlated with higher labour earnings. And the belief that education also improves one's living perspective is a strong argument for undertaking substantial schooling investments. Why is education rewarded? As long as theory goes, a general answer lies in the increase in productivity due to education. However, the link does not need to be solely direct. Education can put in motion other mechanisms that make individual increase productivity and, hence, incomes. This paper sets forth to understand why education is rewarded in a rural context by investigating the direct and indirect roles that education plays in explaining the changes in income during the period of market liberalization in rural Chinese households.

The fast Chinese growth finds no parallel in economic history. Since the inception of policy reforms in 1978, real incomes per capita have rapidly increased at an impressive rate. Starting in the early 1980s, the Chinese government implemented a series of policy changes that loosened restrictions on labour mobility from agriculture. Several of these factors contributed to the remarkable performance during the early 1980s. For instance, the adoption of Household Responsibility System is identified as a major contributor to income growth prior to 1984 because it created a profound one-time effect on earnings through increased labour effort and price incentives (Lin, 1992). Also, agricultural research and technological changes are found to have raised crop yields (Huan and Rozelle, 1996). While these studies are primarily concerned with productivity gains within agriculture and the period of agricultural reforms, they do not systematically look at the sources of growth subsequent to agricultural reforms.

Despite restrictions to rural-urban migration until the 1990s, farm households were already encouraged to seek non-agricultural employment and to establish off-farm businesses. The idea of leaving the farm without leaving the countryside has long been regarded a strategy to absorb labour surplus that is due to gains in agricultural productivity. According to the National Statistics Bureau (2006), during the period of 1985 to 2005, the percentage of rural labour force that was employed in non-

agricultural sector increased from less than 35 percent to over 55 percent. Meanwhile, income from wage employment and other off-farm activities contributed to over 50 percent of total income during the period of 2001 and 2005, up from less than 30 percent in the period of 1978 and 1984. Figure 1 summarizes these changes. It generally suggests that there is a one-to-one movement between income growth, non-agricultural labour and non-agricultural income growth.

There is a large literature that relates education to income in rural China.[1] Consistent with prior belief, returns to education were low in agriculture, and resulted from lacking learning opportunities in the sector. Meanwhile, another growing strand of the empirical literature has sought to determine the effect of education in non-agricultural income. By estimating Mincer equations, these studies have found that education significantly increased earnings in the non-agricultural sector.[2]

By and large, the aforementioned studies evaluate the effect of education on earnings separately for agricultural and non-agricultural sectors. Theoretically, if choices to work in either agricultural or non-agricultural sectors are made optimally, separate estimation captures the effect of education on earnings in either sector. This strategy is justified if there is no major re-allocation of resources between these sectors. However, it is not if rural households are constrained from making optimal decisions, and there are market imperfections due to policy controls. If education is to play a role in facilitating resource allocation between sectors, estimating separately earning functions for agricultural and non-agricultural sectors misses the true impact of education because it captures the effect of education that comes from re-allocation. That education can affect allocation decision is put forward by Welch (1970), Wallace (1977) in the context of American agriculture, and in the case of rural India by Rosenzweig (1995). The central hypothesis in those models is that education enhances farmers' ability to deal with market disequilibria and hence improve farmers' ability to allocate labour and capital.

[1] See Jamison and van Der Gaag (1987), Li and Li (1994), Li and Zhang (1998), Cook (1999).

[2] See Li and Urmanbetova (2002), de Brauw and Rozelle (2006) and Deng (2007).

The paper is structured as follows. Section 2 outlines key policy reforms, affecting rural China. Section 3 discusses the analytical framework in which households maximize net income or profits from production which takes labour, capital and education as inputs. Then, Section 4 explains briefly the rural household level data of China Household Income Project (CHIP) for three successive years: 1988, 1995 and 2002. Section 5 tests the analytical model, based on Section 3. Section 6 concludes.

2. Policy Reforms in Rural China

In 1949, the China that the Communists Party took over was a desperate poor agrarian economy with hardly any industrial assets. Ninety percent of the population lived in rural areas, toiling on small plots of land using century old labour intensive farming technology. Starting in 1953, in order to fuel industry, the central government amalgamated small rural cooperatives into large communes, with each encompassing thousands of households, in hope to raise grain output. To please the central government, local cadres responded by making baseless claims about grain yields. Believing that collectivization had solved China's food shortage permanently, the government diverted rural labour force from agricultural production to industry. However, agricultural output plummeted, resulting in Great Famine (1959 - 1961), where millions died.

After the Great Famine, the government reinforced grain production by introducing quotas and commune system. Under the commune system, grain production was carried out in a unit of 50 households. Households have no responsibility to produce more than meeting the quotas. As a result, incentives to innovate were weak and family businesses were largely banned. Meanwhile, rural non-agricultural activities remained subsidiary to agriculture, and included mainly the production of iron, steel, cement, chemical fertilizer, hydroelectric power and farm implements. At the dawn of

reforms, only 7 percent of the rural labour force was employed in non-agricultural industries. Due to restrictions, returns to capital and labour in these industries were high.

Starting in 1978, a set of policies were implemented to increase agricultural productivity such as the implementation of the Household Responsibility System and the liberalization of domestic markets. Contrasting to the Soviet and Eastern Europe experiences, reforms in China were carried out in a small scale. In 1978, when the rest of the Chinese rural areas were operating under the collective farming system, in Fengyan county of Anhui Province, households began to contract with the local government for delivering fixed quota of grain in exchange for farming on a household basis. But it was not long before the practice was also adopted by the rest of the counties in the province. By 1984, almost all the farm households across China adopted this method. This institutional change induced strong family work effort, thus reducing the demand for workers on small Chinese farms. During the same period, the government reduced the number of production planning targets (grain quotas), which enabled individuals to have increased command over their productive resources. Of the remaining targets, few were mandatory and many were guided by complementary prices and incentive schemes (Sicular, 1988). Farmers could adjust inputs according to profit margins.

In consequence, the set of policy changes injected a large amount of funds into the rural economy. In turn, these funds created a demand for industrial products and capital investment from the industrial sector. Liberalization of the rural market facilitated the sales of products and the purchase of inputs. By late 1980s, accelerated growth in rural industries was already imbedded. Rural households were conscious of their alternative opportunities. Of the many forms of rural industries that prosper subsequent to agricultural reforms, the Township and Private Enterprises (TVEs) were considered to be the pillar of institutional changes during 1990s. TVEs are neither state-owned firms nor private firms. They are local government firms that gained prominence over other forms of enterprises because their hybrid nature put them in a

better position in the face of the predatory of state-owned firms. These enterprises were more likely to adopt new technologies through their links with state-owned enterprises, and also increased their access to credits from banks. The development of these enterprises was unprecedented. Between 1979 and 1993, the share of TVEs accounted for over 27 percent of the national industrial output, up from 9 percent in 1979. During the same period, private enterprises increased from 0 to 9 percent. Combining TVEs and private enterprises, rural industries as a whole produced over 36 percent of the national industrial output and employed more than 123 million people.[3]

As reforms deepened, a set of drawbacks emerged, notably, restrictions on labour migration from rural to urban sectors. Chinese households were under the *hukou* system. This system identifies a person as a resident of a specific area. The number of workers allowed to migrate was tightly controlled by local bureaucracies. Rural households would lose their land title did they choose to migrate (Zhao, 1999). For those who successfully migrated, they are not entitled to employer provided benefits such as health care and education. Historically, with a large population, *hukou* limited mass migration from the hinterland to the cities and ensured stability. By regulating labour in such a way, it ensured the supply of low cost labour to the urban areas when needed. However, with increasing openness, China had the pressure to embrace a reform that would ultimately liberalize the movement of all factor inputs.

3. An Analytical Framework and Methodology

The analytical framework uses a farm household model with a static profit maximization problem, in which a representative household's profits or net income depends on both agricultural and non-agricultural productions:

$$y_j = f_j(k_j, l_j, e)$$

As is standard in the literature, I assume that production function *f* is concave for all input factors and that these factors are complementary to each other. The

[3] See Che and Qian (1998).

subscripts $j \in \{a, na\}$ represents agriculture activities (a) and non-agricultural activities (*na*), *k* represents capital investment and *l* labour supply by rural households; while *e* denotes education. Households choose k_j, l_j to maximize profits:

$$\max_{k_j l_j} V(k_j l_j, e) = \sum_{j=1}^{2} p_j f_j(k_j l_j, e) - \sum_{j=1}^{2}(w_j l_j + r_j k_j) \qquad (1)$$

The first term of equation (1), $\sum_1^2 p_j f_j(k_j l_j, e)$, is the total revenue of production. The second term $\sum_1^2(w_j l_j + r_j k_j)$ refers to the cost of production. Several assumptions are made to facilitate interpretation and to capture the most relevant aspects of the Chinese economy. First, I assume all factor inputs are fixed in supply:

$$k_a + k_{na} = 1$$
$$l_a + l_{na} = 1$$

Total capital stock and labour supply are normalized. Therefore, only relative amount matters. In the case of capital investment, the assumption is justified as long as borrowing from outside is costly and that households are constrained by the availability of credits in the short run.[4] In terms of labour, it is reasonable to think of labour supply as constrained by the time available to each household members or that family labour supply is limited by household size. These are factors that can only be changed in the long run. Education is not chosen by the representative household, rather, it is determined *ex-ante* in the model, or that it is not driven by variables that will affect inputs and education simultaneously. In other words, the empirical strategy relies on variation in personal characteristics. With these considerations, the household's maximization problem can be solved in terms of all exogenous variables. Under competitive market assumption, the optimal choices of labour and capital are given by:

$$l_{na}^* = l(p, w, r, e)$$
$$k_{na}^* = k(p, w, r, e)$$

While these optimal solutions can be viewed as a reference in studying farm households' behavior, they have not taken into consideration that Chinese rural households are still constrained from making optimal decisions due to policy controls,

[4] This paper does not investigate the role of capital accumulation as in Chow (1993). The focus of the paper is given to how education affects allocation decision at each point of time.

such as those controls on labour mobility. Quantitatively, labour constraints imply:

$$l_{na}^{*} \geq l_{na}$$

where l_{na}^{*} is the optimal choice of labour, and l_{na} is the one under policy restrictions. The complementarity of inputs implies that investment decision of non-agricultural capital investment is also undertaken:

$$k_{na}^{*} \geq k_{na}$$

At this point, we have completed the full characterization of the household problem. It involves maximizing households' net profits subject to resource constraints given by equation (2) – (4). The solutions, expressed in terms of all exogenous variables are:

$$l_{na} = l\,(p, w, r, e) \qquad (2)$$
$$k_{na} = k\,(p, w, r, e)$$

Ultimately, we are interested in the relationship between education and the household's profits. This relationship can be obtained by substituting (2) into the profit function (1) to obtain $V(l\,(p,w,r,e), k\,(p,w,r,e), e)$. Totally differentiating this expression yields:

$$\frac{\partial V}{\partial e} = \frac{\partial V}{\partial l}\frac{\partial l}{\partial e} + \frac{\partial V}{\partial k}\frac{\partial k}{\partial e} + \frac{\partial V}{\partial e} \qquad (3)$$

Equation (3) provides the basis for empirical analysis. There are two major elements to interpret: the first two terms and the last term in Equation (3).

1. The major contribution of this paper to previous studies refers to the terms: $\frac{\partial V}{\partial l}\frac{\partial l}{\partial e}$ and $\frac{\partial V}{\partial k}\frac{\partial k}{\partial e}$. In particular, it suggests that education may increase net profits by altering the choice of labour supply and capital, provided that $\frac{\partial l}{\partial e} \geq 0$ or $\frac{\partial k}{\partial e} \geq 0$. It is important to justify the assumptions that $\frac{\partial l}{\partial e} \geq 0$ or $\frac{\partial k}{\partial e} \geq 0$. Clearly, if decisions are made at the optimum, the terms must vanish to zero because of the Envelope Theorem. In other words, any effect that education has on the endogenous variable (capital and labour) should already be reflected on the sole effect that education has on net profits – a small change therefore must not have an effect on the overall net profits. However, the presence of restrictions on labour mobility poses a constraint regarding the choices households can make. Therefore, the decisions can only be made *below* the optimum,

suggesting that $\frac{\delta l}{\delta e} > 0$ or $\frac{\delta k}{\delta e} > 0$. Given that profit function is assumed to be concave in all arguments, i.e., $\frac{\delta V}{\delta l} > 0$ and $\frac{\delta V}{\delta k} > 0$, equation (6) is positive. See appendix for details on the derivation.

2. The last term $\frac{\delta V}{\delta e}$ captures the productive effect of education on household's profits. The latter has been the focus of previous studies that estimate the returns of education separately in agriculture and non-agriculture.

Below I propose an estimation methodology to disentangle the indirect and the direct effects of education on net profits. The variables of interest are: $\frac{\delta V}{\delta l}\frac{\delta l}{\delta e}$ and $\frac{\delta V}{\delta k}\frac{\delta k}{\delta e}$. One way to tackle this problem is to employ *Two Stage Least Squares (TSLS)* estimates, in which one estimates the effect of education on labour and capital separately in the first-stage estimation by controlling factor endowments:

$$l_{na} = \alpha + \beta_1(factor\ endowment) + \beta_2(education) + \varphi X \quad (4)$$
$$k_{na} = \delta + \gamma_1(factor\ endowment) + \gamma_2(education) + \varphi X$$

The variables of interests are β_2 and γ_2 since they estimate the effect of education on allocation choices for capital and labour supply. If the economy is operating below the optimum, we would expect at least one coefficient to be significantly greater than 0. Our ultimate interest is to estimate the net profit function in terms of household factor endowments, labour supply, capital stock, education and a set of controls:

$$net\ profit = \rho + \theta_1(factor\ endowment) + \theta_2(l_{na}) + \theta_3(k_{na}) + \theta_4(education) + \varphi X \quad (5)$$

To obtain the estimates that come from factor allocation and total output separately, I substitute the predicted values from equation (4) and (5) for capital and labour supply, respectively, to obtain the following expression:

$$\begin{aligned} net\ profit = {} & \rho + \theta_1(factor\ endowment) \\ & + \theta_2(\alpha + \beta_1(factor\ endowment) + \beta_2(education)) \\ & + \theta_3(\delta + \gamma_1(factor\ endowment) + \gamma_2(education)) + \theta_4(education) + \varphi X \end{aligned} \quad (6)$$

The effect of education on net profit comes from augmenting capital and is given by $\theta_2\beta_2$ and labour supply by $\theta_3\gamma_2$ while the direct effect of education on net profit is given by θ_4. The combined effect of education on net profits is given by:

$$\frac{\partial V}{\partial e} = \theta_2\beta_2 + \theta_3\gamma_2 + \theta_4 \qquad (7)$$

4. Data

The analysis is run using household level data in rural China. The dataset is called the China Household Income Project (CHIP), which consists of three cross-sectional surveys in 1988, 1995, 2002. In all three surveys, households were asked to report their capital stock, sectors of employment, types of employment and other basic information for individuals and households. The original goal of this survey was to provide information in monitoring the changes in income inequality in China. In recent years, the surveys have been extended to include more detailed information. For example, starting in 1995, the surveys record the days that are spent on a set of agricultural and non-agricultural activities. In 2002, it records the daily average hours spent on these activities. In addition to the number of labourers employed in different sectors, the surveys also report their occupation.

There are 19 overlapped provinces in the three surveys (China has currently nearly 30 provinces). Consistent with the definition of agriculture, people are grouped as agricultural labourers if they are primarily engaged in forestry, fishery, cropping and husbandry. And, the number of non-agricultural labourers is found as residual from the household total number of workers. Household net profits are calculated as the income from both agricultural and non-agricultural activities, net of production costs.

There are two types of capital stock: Agricultural and non-agricultural capital. Agricultural capital includes draft animals, large and medium-size farming tools and

equipments. Nonagricultural capital includes industrial machinery, transportation and construction machinery and storage space. The survey also reports types of land, and the estimation uses the size of cultivated land.

Schooling is reported in two ways. In 1988, the survey only asks the level of education the individual completes. Starting in 1995, the surveys ask the *years* of education the individual completed. Table 1 reports the summary statistics of basis economic and schooling variables. Panel A reports real per capita income and productive inputs, and shows that real per capita income increases for the whole period studied. Average household size decreases from over 5 to 4.6, and speak to restrictions on family planning and mortality. Rural labour force resembles the similar pattern. Panel B contains information on factor inputs allocation. The sharp increase takes place in non-agricultural labour supply, as it rises from 12 percent in 1988 to over 47 percent in 2002. The share of capital that is employed in non-agricultural sector, on the contrary, stay relatively stable over the period studied, despite it is growing in absolute amount. Panel C contains information on schooling experiences of the workforce. Educational attainment has increased over the period, and average work experience remains unchanged.

5. Empirical Results

Large income gains are recorded for higher educational attainment in China. Figure 2 plots real per capita income across working individuals with different educational attainments over the period from 1988 to 2002. For the period 1988-1995, the figure reveals little difference across educational attainment and no systematic difference across different educational attainments within a given year. However, individuals with higher educational attainment achieve rapid growth rate in real income by 2002. This section ultimately examines changes in households' net incomes after reviewing labour and capital in non-agricultural activities.

Non-agricultural labour supply

Section 3 characterized the share of non-agricultural labour supply within the household as a function of education, household endowments and a set of community controls. Table 2 reports a first round of estimates from the pooled cross-section results, using the CHIP data mentioned above. The dependent variables are log-transformed. Column (1) reports results without controls and Columns (2) – (5) include the county-fixed effects and year-fixed effects, and other controls. A major observation is that non-agricultural labour supply increases as the highest educational attainment in the households increases. Returns to senior high and to university degrees range from 0.089 to 0.232, and remain statistically significant and positive across specifications (I also adjust these estimates to find the return to "an extra year of education"[5]). However, these first results also show that average education attainment in a household is negatively correlated (and significant) with respect to non-agricultural labour. With all controls, average education attainment even offsets most of the effect from university or senior high school education. These results indicate that non-agricultural labour might be too broad a category so that the impact of education is being understated. In other words, if one pools the information of a household with two people employed in the non-agricultural sector (one is a physical labourer and the other, a technician), then one would underestimate the effect of average education on the household's non-agricultural labour supply.

So then, I turn to defining non-agricultural labour in terms of occupations. The Chinese dataset contains household members' occupations,[6] which differ in terms of education and skill requirements. So if education augments labour allocation, I expect that labour

[5] The conversion to a return for an "extra year of education" is done by dividing the difference between the return of the two educational categories with their difference in terms of years of education. For example, the estimated return to university education is given by 0.17 and that to senior high school of the same regression is given by 0.10 (first row in Table 2). Going from senior high school to university takes 4 years so the return to an additional year of education from senior high school to university brings roughly 1.8 percent increase (that is, is given by 0.17 - 0.10 /4 = .0175).

[6] CHIP specifies eleven types of occupations: Technical specialists, enterprise shareholders, state-owned enterprise manager, cadre in the enterprises, cadre in the township and village governments, township and village enterprises (TVEs) shareholders, workers, casual workers and farmers.

supply would be more responsive to the level of education in occupations that are more skill- or education-intensive. Table 3 explores a different specification of non-agricultural labour from Table 2. Instead of grouping individuals according to the sector of employment, I now look at the type of occupations, excluding agricultural labourers (to define non-agricultural labour), and excluding casual workers and other labourers (to define non-agricultural and non-casual labour). Panel A uses share of non-agriculture labour as dependent variable. None of the coefficients of the education variables are significant (and senior high school education has in fact a negative impact on labour supply). Here education has little or no impact, similar to the initial findings in Table 2 for average education. It is also possible that the regression takes up the largest proportion of the occupation categories on which education have no impact. This is not surprising because casual workers account for approximately half of the observations. To validate this possibility, Panel B and C report results of the same specifications excluding casual or other workers. The results for non-agricultural, non-casual labour suggest that labour supply is more responsive to higher level of education in skill-intensive occupations.

The next step is to ensure that the effect of education is not driven by omitted household characteristics (I had checked for measurement error in education[7]). Two such characteristics are party membership and gender of the household member with the highest education. Table 4 (top and bottom panels) summarizes the effect of education by these two characteristics. If education does play a role in facilitating labour mobilization from agricultural to non-agricultural activities, one expects that level of education of the most educated household member explains significantly the variation in non-agricultural labour supply regardless of the party membership and gender of the household head. The results confirm that both party members and non-party members benefit from education, however, the effect of education on non-

[7] Individuals without completing designated years of study in a given education category tend to over-report. In this case, the effect of highest level education may be overestimated. To check whether this is an issue, I restrict my attention to those who completed exactly the years to acquire a degree. Because the CHIP does not report the years of education in 1988, the estimates are therefore drawn on pooled cross-sectional results from 1995 and 2002 only. The results do not change substantially, suggesting that the estimates are not plagued by measurement errors.

agricultural sector labour supply in occupations of higher skill intensities is more pronounced for party members in the higher education level.[8] Similarly, for the same education level, it is more likely for household members with men being the highest educated to be engaged in non-agricultural activities and occupations.

Further, I refine the concept of non-agricultural labour from share of workers in household to time spent in non-agricultural activities. Time spent in non-agriculture activities poses more advantages to the estimation than using the share of household members working in non-agricultural activities (Table 2) or share of household members working in non-agricultural and non-casual activities (Table 3). For instance, an individual's perspective of being engaged in non-agricultural activities may be more correlated with his/her characteristics, as opposed to the highest educated in the household, and it is also possible that the highest educated member in the household, though powerless in influencing the probability of other household member's employment, can indirectly affect their choices of non-market activities and leisure and hence alter the pattern of time use of other household members.[9] In Table 5, I turn to examine time spent in non-agricultural labour as the dependent variable to characterize non-agricultural labour within households in order to examine further the relationship between education and time allocation in non-agricultural activities. The dependent variable is number of days in a year dedicated to agricultural and non-

[8] Researchers have shown that party membership causes rising income inequality in rural China. Using a detailed panel dataset from Dongping county of Shangdong province, Sicular and Morduch (2000) show that party membership can explain as much as 36 percent of rising income inequality from 1992 to 1993. According to the authors, party members substantially outperform the rest because they have better access to non-agricultural activities, particularly sideline business where personal connections may play a bigger role. Also, the unequalizing effect of party membership is not due to variation in access to education because party members are already better educated. The results in Table 4 confirm the findings by Sicular and Morduch. Education does not affect party and non-party members equally. Party membership mobilizes educated workforce and hence increases their earnings.

[9] Increase in market wage has an ambiguous effect on individual labor supply, depending on the income and substitution effects. On the one hand, individuals' labour supply is prompted by an increase of wage rate. On the other hand, labour supply may decrease given that less amount of work is required to maintain the same welfare level. However, according to Gronau (1977), treating all non-market activities as leisure is problematic because these activities are affected by socioeconomic conditions in a different way from leisure. By examining a sample of married women, he finds that education induced wage rate increase leisure and reduce work in the market, but has no effect on home production. Moreover, neither total household income nor unearned income affects employed women's work at home.

agricultural activities.[10] In Column (1), the coefficients of the education variables are positive and significant without controlling the family background and wage effects. Going from junior high to senior high expects about 3 percent increase (per average year) in time allocated to non-agricultural activities. However, there is a negative effect on non-agricultural time if one goes from senior high to university. This may be due to limited number of observations at the higher education level. Columns (2) – (3) add family background and explore the implication of wage rate (measured as the highest in the household) on time allocation. As expected, wage rate is positively correlated with time allocated to non-agricultural activities. The coefficients on the education variables are still significant though decrease in terms of magnitude. This is not surprising, given that wage rate and education may be highly correlated. However, the inclusion of wage rates does not diminish the explanatory power of education. Similarly, Columns (4) – (6) explore the relation between education and time allocated to agricultural activities. Wage rates introduce the need for further corrections.[11] Columns (7) – (8) contain 2SLS results and confirm that OLS results on education are biased downwards. After controlling for education level, the wage effect on the time allocation disappears. In short, the data support the prediction of the model: Education augments allocation towards non-agricultural activities in response to market changes.

Non-agricultural capital

The economic model proposed in Section 3 predicts that education is also positively related to the capital allocated to non-agricultural activities. I use two dependent variables for capital in Table 6: Absolute productive non-agricultural capital and the

[10] The analysis draws on 1995 and 2002 data only. Data on allocation are not available for 1988.

[11] Daily or hourly wage rates are calculated by dividing annual earning by total days or hours worked. It is well-known that this method introduces serious measurement errors, which bias the effect of wage rate. Besides, any effect that wage has on labour supply may operate through the effect of education on wage function given the consensus that education is an important determinant on of wage rate. Therefore, the effect of education should be larger than what OLS results indicate once its effect on wage rate is taken into account. To address these concerns, I employ Two Stage Least Square (TSLS). At the first stage, I use the highest education, average education, and experience of the household to predict the wage rate. At the second stage, I introduce the predicted wage rate in the time use functions. Not surprisingly, the highest education level has a strong predicting power on hourly wage rate.

percentage of productive non-agricultural capital. The latter better captures the idea that better educated farm households allocate a larger proportion of the fixed capital stock towards the non-agricultural sector. The estimation is based on equation (5) of Section 3. I predict that non-agricultural capital stock as a function of education, total fixed capital stock, household labour supply and a set of community characteristics. Column (1) uses the amount of non-agricultural capital as dependent variable. As expected, the effect of education, though is of expected sign, is insignificant. Column (2) uses the percentage of capital employed in the non-agricultural sector, and shows that the percentage of capital allocated to non-agricultural activities starts to increase as the highest household education level. Similar to the case of labour supply, average education level has little effect on capital allocation and so does experience.

The most obvious disadvantage of using pooled cross-sectional data is that it does not allow one to control omitted characteristics and therefore, may have an effect on family labour supply and capital investment which is independent of education. For example, regions where there are more non-agricultural activities may have higher than average education level due to the demand of skills. Second, the assumption that education is exogenous may be tainted by omitted family background characteristics. For example, education may be correlated with father's or mother's education or skill. This sort of endogeneity plagues cross-sectional comparisons and can only be solved by comparing the same individuals of different education levels over time.[12]

I attempt to address these issues by aggregating the data and replicate the household analysis at the county level. Although this is a less appealing approach in that counties in China vary in a lot of dimensions and hence full control is impossible, it allows me to control all factors that may affect education simultaneously. For example, while it is reasonable to believe that an individual's education level is dependent on his/her innate skills and the education experiences of his/her parents, it is less likely that this sort of correlation will be reflected at the county level. Aggregated information at the

[12] The CHIP asks individuals whether they have been previously surveyed and if yes, when. I attempted to create a panel using this piece of information. The resulting sample is quite small and almost exclusively in one or two villages, which does not seem appropriate for this analysis.

county level includes: the proportion of party members and men at the county, the proportion of surveyed household located in plain area, and the percentage of household reported as living under poverty. Following Welch (1970) and Huffman (1977), I calculate the weighted average years of education in the five schooling completion classes for each year.[13] The weights are given such that they are heavily skewed to the highest education level (university education). This makes what is being estimated at the county-level more comparable to the household level results. In all regressions, I include a year-fixed effect, a year- and county-fixed effect and a county-fixed effect. As such, any changes that affect the overall level of labour supply and capital investment for all counties over time will be captured by the year-fixed effect; any changes that affect different counties over time be absorbed by the year-county-fixed effect. I include a county-fixed effect to take into account unobservable county characteristics such as taxes that may favour or hamper non-agricultural development.

Results in Table 7 mimic those from the household level analysis. In the case of labour supply, they are roughly consistent with the household level analysis: 1 percent increase in weighted education level is associated with over 2 percent increase in labour supply in non-agricultural sector. However, compared to the household level analysis, the weighted education level does not seem to have an impact on non-agricultural capital investment. This may in part due to the loss of accuracy in the course of aggregation, or in part because at the aggregate level, non-agricultural capital investment is more likely driven by capital formation.

Non-agricultural net income

The economic model outlined in Section 3 stated that education affects household net income through allocating factor inputs – labour and capital – towards non-agricultural

[13] The weights for each education category are 0.25 for the illiterate; 0.65 for elementary; 1.63 for junior high school; 2.26 for senior high school and 4.27 for university or college. The weighted average of education is thus calculated by the summation of the product of weights and actual years of education for each education category. It is worth noting that years of education are not reported in 1988, I thus assign each education category with the designated years of completion and 3 for the illiterate. Doing this may introduce measurement errors, but results are merely unaffected if I drop 1988.

sector. In the previous sections, I have shown that education does augment non-agricultural labour supply and capital investment in various degrees. Those estimates (from Table 2 to 7) serve as the first stage estimation in calculating the effect of education on net income. Table 8 reports the results by separately estimating the net income function at the household and county level. The OLS results in Panel A suggest that going from senior high school to university is associated with 1 percent log point increase in the net household income. However, the effect of all the rest of the educational categories does not seem to be statistically different from the illiterate. These results echo the observation in Figure 2, in that after controlling factors that may raise the net income level of all education attainments over time only education attainment that is and above senior high school level significantly improves. While 1 percent increase in the share of non-agricultural labour supply is associated with .24 percent increase in the net income, increasing the share of non-agricultural capital investment does not have an impact on the net income. Compared to the OLS estimates at the household level, the effect of weighted education is insignificant in Panel B. One possible explanation is that the effect of education may be "soaked up" by community background controls and the share of non-agricultural supply in the workforce. The 2SLS results "instrument" the share of labour supply and capital in non-agricultural sector with education variables based on what they should be. As expected, the education variable still maintains its statistical significance at the household level. Going from senior high to university sees a 1.1 percent log point increase in household net income. However, none but university level education seems to have an impact on per capita household net income directly. The impact of the share of non-agricultural labour diminishes as one controls for education: 1 percent increase in the share of non-agricultural labour is associated with 6.5 percent increase in net income. In contrast to the OLS results, a 1 percent increase in the share of non-agricultural capital investment sees a 21 percent increase in household net income. At the county level, 2SLS results indicate that 1 percent increase in weighted education is associated with 2 percent increase in the per capita net income. While 1 percent increase in the share of non-agricultural labour supply increase the per capita net income by 9.5 percent, increasing the share of non-agricultural capital does not seem

to impact net income. Taken together the estimates in Table 2 Column (5), Table 6 Column (2) and the 2SLS estimates in Table 8, one can calculate the total effect of education using equation (7) in section 3, that is:

$$\frac{\partial V}{\partial e} = \theta_2\beta_2 + \theta_3\gamma_2 + \theta_4$$

At the household level, for example, going from junior high to university is associated with β_2=11.7 percent log point increase in the share of non-agricultural labour supply and γ_2=7 percent log point increase in non-agricultural capital investment (or equivalently, 1.3 percent increase in the share of non-agricultural labour supply and 1.2 percent in the share of non-agricultural capital investment, respectively). These figures multiplied by the contribution of the share of non-agricultural labour supply, $\theta_2 = 64.7$ percent, and capital investment, $\theta_3 = 21$ percent, tells us the effect of education on household net income that comes from better allocation, with labour 7.6 percent (11.7% times 64.7%) and capital investment 1.4 percent (7% times 21%). The total impact of going from junior high to university on net income is given by summing up the three items: 18.8 percent (7.6% + 1.4% + 9.8%). This estimate is much greater than what the OLS suggests. The full impact of education has on net income at the county level can be calculated in the same way: 2.4 percent (2.8% times 9.5% + 0 + 2.07%), also much higher than the estimate used with OLS.

6. Concluding Remarks

To a large extent, the study of China mirrors the experiences of other developing countries, where rural households must face the perspective of leaving the farm, engaging in non-agricultural activities outside the farm or even migrating to the cities. While past reforms have greatly ameliorated the productive efficiency of rural economy, China is still facing adjustment and mobility of resources across rural and non-rural sectors. Education enhances rural households' ability to deal with changing market conditions.

In the paper, I hypothesized that education augments rural household's choice of labour supply and capital investment. Better educated households are not only more productive, but also are able to make better decisions in response to changing market conditions. I then quantify the effect of education on households' allocation by using the share of non-agricultural labour, the share of family labour employed in occupations with higher skill intensities, and the share of capital invested in non-agricultural sector as proxies for allocative ability. The results at the household or county level show that education improves standard of living significantly. Going from junior high school to university increases income by 18 percent.

Hence, higher education investment appears worthwhile for rural areas. However, at least, two important caveats are in order for this policy recommendation. First, the large benefits associated with higher education are driven by the rapid changes in the composition of skills. If the economy had not generated jobs with greater skill intensities, higher education would have resulted in low or no benefits to households' net income. Also, I have looked at the effect of education on households' net income by categorizing households in terms of degree completed without differentiating among types of higher education. Hence, further analysis about job creation and about the different types of higher education should complement any policy recommendation to increase higher education in rural China.

7. Tables and Figures

Table 1: *Summary Statistics: Whole Sample*

	1988	1995	2002
Panel A - Real Per Capita Income and Major Production Inputs (Per Household)			
	Mean(Std.)	Mean(Std.)	Mean(Std.)
Real Income	547.1043(389.2605)	742.5389(640.4414)	1216.958(1091.547)
Average Household Size	5.5489(0.3738)	4.7283(1.3755)	4.5297(1.3526)
Land	6.34384(13.1129)	6.04511(86.7501)	4.6952(5.3791)
Laborforce	3.1913(1.4496)	2.8516(1.3061)	2.6559(1.2758)
Productive Capital	1341.6620(1962.6870)	1299.145(2418.5660)	2147.303(5649.7100)
Panel B - Allocation of Inputs (By Household Average)			
No. of Agricultural Labor	2.7729(1.4809)	2.3060(1.3151)	1.4855(1.2468)
No. of Nonagricultural Labor	0.41839(0.8238)	0.5456(0.8477)	1.1711(0.9782)
Per. Nonagricultural Labor	12.8484(0.2417)	18.9771(0.2868)	47.2442(0.3475)
Agriculture	592.2327(954.3854)	609.0773(1019.308)	647.1916(1265.524)
Capital in Nonagriculture	511.3884(1311.298)	690.0678(2174.619)	784.3434(3489.345)
Per. Nonagricultural Capital	43.1531(0.3350)	43.7901(0.3637)	42.6123(0.3633)
Panel C - Schooling and Experiences of Working Household Members			
Highest Education	3.1013(0.8020)	2.8058(0.7110)	2.6141(0.7268)
Ave. Education	3.8007(0.62410)	3.6825(0.5395)	3.4181(0.5799)
Ave. Education of Household Head	3.6223(1.5257)	3.4043(0.8864)	3.2104(0.8645)
Ave. Experiences	21.0342(15.8514)	20.5518(18.4435)	20.3390(17.7563)
Per. Illiterate and Semi-illiterate	25.97	24.72	17.02
Per. Primary School(4 years and more)	36.47	29.41	24.45
Per. Junior High School	28.98	35.95	43.42
Per. Senior High School/Equivalent	8.06	9.21	13.58
Per. University and College	0.52	0.71	1.53
Panel D - Georgraphic and Administrative Information			
Per. Plain Areas	47.4	46.38	49.53
Per. Hilly Areas	31.06	29.23	29.51
Per. Mountainous Areas	21.54	24.39	20.96
Local Levies	12.0700(28.0812)	41.2930(55.7521)	89.9650(214.7693)

Source: CHIP 1988, 1995, 2002.

Table 2 **: Pooled cross-section results**

	Share of Non-agricultural Labour Supply				
	(1)	***(2)***	***(3)***	***(4)***	***(5)***
Education (highest)					
University	.171***	.182***	.232***	.174***	.117**
	(.056)	(.054)	(.052)	(.053)	(.055)
Senior High	.103**	.123**	.171***	.123**	.089**
	(0.54)	(.054)	(.051)	(.054)	(.053)
Junior High	.063	.096*	.151***	.105**	.065
	(.052)	(.052)	(.049)	(.052)	(.052)
Elementary	-.059	-.034	.004	-.026	-.033
	(.054)	(.053)	(.051)	(.053)	(.053)
Education (average)			-.084***	-.09***	-.154***
			(.023)	(.023)	(.026)
Experience				-.003***	-.002***
				(.001)	(.0007)
Experience (squared)				1.5-5e	2.8-5e**
				(1.3-5e)	(1.4-5e)
Productive capital stock					.006
					(.005)
Family labour					.096***
					(.005)
Land					-.046**
					(.009)
Party					.032***
					(.012)
Gender					.018***
					(.005)
County fixed effect	No	Yes	Yes	Yes	Yes
Year Dummy	No	Yes	Yes	Yes	Yes
R-squared	0.01	0.19	0.19	0.2	0.38
Obs.	21871	21871	21871	21825	17162

Note: All regressions are run at the household level. Standard errors are reported in the parenthesis and are clustered at the county level. I also include controls that are likely to affect household profits such as geographic conditions and a dummy indicating whether roads have been constructed in the village.
***significant at 1%, **significant at 5%, *significant at 1%.

Table 3: **Pooled Cross-section Results Using Occupation as Dependent Variable**

Panel A: Share of labour employed in occupation excluding farming labour	
Education	
University	.0034
	(.063)
Senior High	-.026
	(.060)
Junior High	.009
	(.060)
Elementary	.044
	(.059)
Observations	10693
Panel B: Share of labour employed in occupation excluding casual workers	
Education	
University	.109***
	(.041)
Senior High	.115***
	(.031)
Junior High	.097***
	(.030)
Elementary	.086***
	(.028)
Observations	19600
Panel C: Share of labour employed in occupation excluding other workers	
Education	
University	.119***
	(.045)
Senior High	.112***
	(.036)
Junior High	.086**
	(.033)
Elementary	.081**
	(.023)
Observations	19600

Note: All regressions have the same controls in Table 2, except for the average level of education. Regressions are clustered at the county level. Casual workers are those who do not have a contract or who are short-term. Other workers refer to workers with contracts or who are long-term but not professionals.
*** significant at 1%; ** significant at 5%; * significant at 1%

Table 4: Effect of education by party membership and gender

	Party member				Non Party member			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
University	.0147	-.0287	.2276***	.2000**	.0357	-.06	.1436***	.1548***
	(.1011)	(.1709)	(.0882)	(.0976)	(.0291)	(.041)	(.0245)	(.0257)
Senior High	.0366	.0455	.1734**	.1731**	.0159	-.0955***	.1405***	.137***
	(.0935)	(.161)	(.069)	(.0782)	(.0222)	(.0349)	(.0168)	(.0176)
Junior High	-.0401	.0785	.1271*	.1094	-.0045	-.0628*	.1162***	.1067***
	(.0938)	(.1594)	(.0677)	(.0774)	(.0216)	(.0344)	(.016)	(.0167)
Elementary	-.1165	.2056	.1098	.1176	-.072***	-.0151	.0885***	.0831***
	(.1013)	(.1649)	(.0687)	(.0794)	(.0225)	(.0349)	(.0159)	(.0167)
	Males				Females			
University	.0343	-.0641	.3924***	.4428***	.0486	-.056	.044	.0143
	(.0381)	(.0534)	(.0517)	(.0529)	(.0409)	(.0601)	(.0317)	(.0342)
Senior High	.0106	-.0994**	.3946***	.413***	.0399	-.0729	.0402**	.0279*
	(.0317)	(.0468)	(.0478)	(.0491)	(.0292)	(.0499)	(.0159)	(.017)
Junior High	-.0239	-.0609	.335***	.3421***	.0178	-.0402	.0448***	.0279*
	(.0312)	(.0463)	(.0475)	(.0486)	(.0283)	(.0490)	(.0147)	(.0157)
Elementary	-.0955	-.0036	.2306***	.2415***	-.0485*	.0036	.0550***	.045***
	(.0325)	(.0471)	(.0488)	(.0501)	(.0295)	(.0494)	(.0143)	(.0154)

Note: This table estimates the effect of education on non-agricultural labour supply and occupational choices by party membership and gender. Column (1) uses ln non-agricultural labour at the household level as dependent variable. Columns (2) – (4) use occupation as dependent variables: (2) non-farming labour; (3) non-casual worker; (4) non-workers. Standard Errors are robust. All coefficients are derived from regressions that use the same controls as in Table 2.
***significant at 1%; **significant at 5%; * significant at 10%.

Table 5: The effect of education to time allocation

	OLS						2SLS	
	Non-agricultural activities			Agricultural activities			Non-agri activities	Agri activities
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Education								
University	.8562+	.6947+	.7032+	-.1469**	.1471	-.1217	.9031**	-.3587
	(.1842)	(.1209)	(.1280)	(.0651)	(.5023)	(.3600)	(.3877)	(.4986)
Senior High	.5790+	.7559+	.7609+	-.0972*	.1280	-.1550	.9225+	-.3332
	(.1673)	(.1123)	(.1190)	(.0530)	(.5001)	(.3695)	(.3489)	(.4929)
Junior High	.4530+	.7124+	.7169+	-.0686	.1323	-.1305	.8916**	-.3468
	(.3328)	(.1216)	(.1276)	(.0507)	(.4807)	(.3405)	(.3798)	(.4697)
Daily wage rate		.1059+			-.0904+			
		(.0306)			(.0324)			
Hourly wage rate			.0842+			-.0790+	-.2218	.3449
			(.0276)				(.3683)	(.4039)
Family background controls	No	Yes	Yes	No	Yes	Yes	Yes	Yes
County fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	40997	3781	3781	40997	3218	3334	3188	3161

Note: This table estimates the effect of education on time allocation within the household by holding the number of non-agricultural labour constant. Family background controls include: The number of children under the age of 18, the number of senior over the age of 65, the average experiences of the household members, the average education of the household, whether there is a party member in the household, party membership of the highest educated household, the gender of the highest educated household, the number of family labour, fixed capital stock per capita, cultivated land per capita, the geographic condition where the household is situated.
+ significant at 1%; **significant at 5%; *significant at 10%

Table 6: Estimating the effect of education on capital allocation

	Non-agricultural capital investment	
	(1)	***(2)***
Education (highest)		
University	.0374	.0708***
	(.3917)	(.0254)
Senior High	.1046	.0796***
	(.2700)	(.0215)
Junior High	.0952	.0668***
	(.2605)	(.0209)
Elementary	.2337	.0458**
	(.2674)	(.0211)
Education (average)	-.0677	-.0211
	(.1645)	(.0138)
Experience	-.0044	.0001
	(.0041)	(.0004)
Experience (squared)	.0001	-3.08e-06
	(.0001)	(8.06e-06)
Productive capital stock	1.7343***	.0601***
	(.0136)	(.0070)
Family labour	-.0351***	-.0096***
	(.0350)	(.0024)
Land	-.4646***	-.0975***
	(.0938)	(.0081)
County fixed effect	Yes	Yes
Year Dummy	Yes	Yes
R-squared	.41	.76
Obs.	28426	33930

Note: All regressions are run at the household level. Standard errors are reported in the parenthesis and are adjusted at the county level. I also include controls that are likely to affect household profits. These factors include geographic conditions and a dummy indicating whether the road is constructed in the village. Column (1) uses the stock of productive non-agricultural fixed capital as dependent variable; column (2) uses the *share* of non-agricultural capital in total fixed productive capital stock as dependent variable.
***significant at 1%, **significant at 5%, *significant at 1%.

Table 7: County Level Analysis

	Non-agricultural Labour supply	***Non-agricultural Capital investment***
Weighted	.0279***	-.0022
education	(.0027)	(.0074)
Labour force	.7425***	-.2787***
	(.0078)	(.0560)
Total productive	-.0218	1.2132***
Capital	(.0754)	(.3158)
Year fixed effect	Yes	Yes
County fixed effect	Yes	Yes
Year*county	Yes	Yes
Fixed effect		
Obs.	*305*	*305*
R-squared	*.88*	*.83*

Note: The estimation is run by aggregating household level information to the county level for the years 1988, 1995 and 2002. Standard errors are clustered at the province level. Controls include the share of plains, party members, households living under poverty, per capital taxes on agriculture.
***significant at 1 %

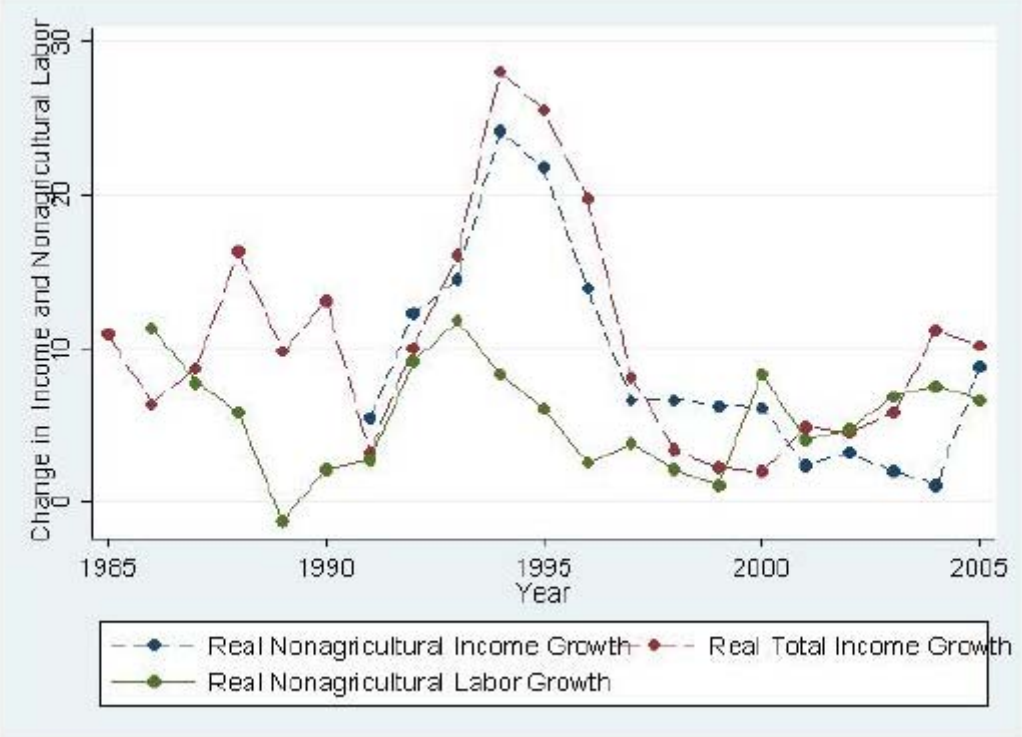
Table 8: Estimating household net income

	Panel A: Household level	
	OLS	2SLS
Education (Highest)		
University	.1523**	.0978**
	(0758)	(.0453)
Senior High	.1126*	.0433
	(.0667)	(.0364)
Junior High	.0404	.0073
	(.0663)	(.0353)
Elementary	-.0182	-.0022
	(.0684)	(.0321)
ln(non-agri labour share)	.2418***	.6470***
	(.0190)	(.0137)
ln(non-agri capital share)	.0022	.2100***
	(.0019)	(.0382)
R-squared	*.49*	*.47*
Obs.	33930	33930
	Panel B: County level	
Ln(weighted education)	.0011	.0207***
	(.0063)	(.0072)
ln(non-agri labour share)	.0814***	.0946*
	(.0249)	(.0555)
ln(non-agri capital share)	-.0123	-.0281
	(.0075)	(.0239)
County*year fixed effect	Yes	Yes
R-squared	*.91*	*.86*
Obs.	*305*	*305*
Family/community controls	Yes	Yes
County fixed effect	Yes	Yes
Year fixed effect	Yes	Yes

Note: This table estimates the effect of education on net income. Panel A uses household level information and controls for year and county fixed effects. Panel B uses aggregate information at the county level. It controls for year, county and year*county fixed effect. All regressions contain family controls as in Table 2. In both panels, 2SLS estimates relies on the predicted values of ln(non-agricultural labour supply) and ln(non-agricultural capital investment) from Table 2 and 6 at the household level, and table 7 at the county level.

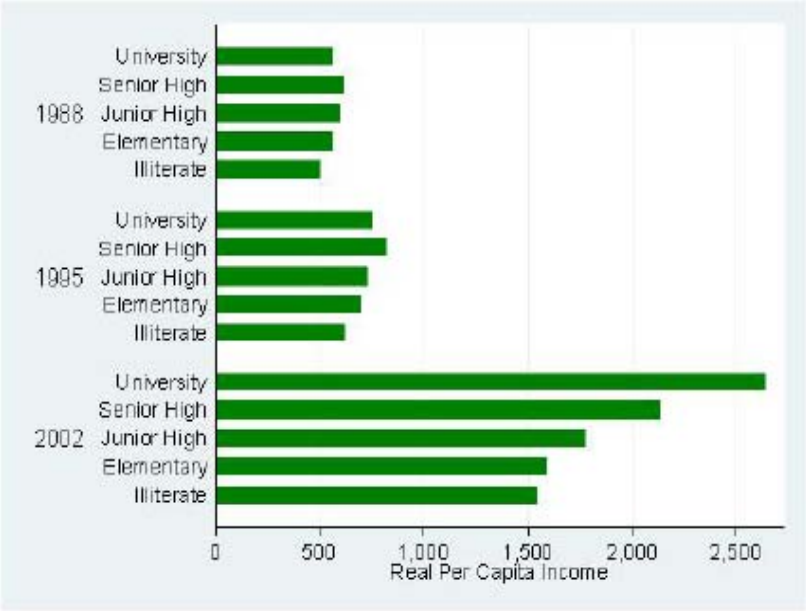
*** significant at 1%; ** significant at 5%; * significant at 10%

***Figure 1*: Real per Capita Income and Non-agricultural Sector Development**



Sources: China Statistical Yearbook, 1996, 2005, 2006; China Statistical Yearbook (Rural Survey), 2006.

Figure 2: Real per Capita Income and Educational Attainment 1988, 1995 and 2002



Source: CHIP Rural Household Surveys.

8. Appendix

This appendix discusses the solution to the economic model of household profit maximization. A representative household maximizes his/her net profit by choice of k_{na} and l_{na}, respectively. Choice of education is predetermined:

$$\max_{k,l} p_a f_a(k_a, l_a, e) - (w_a l_a + r_a k_a) + p_{na} f_{na}(k_{na}, l_{na}, e) - (w_{na} l_{na} + r_{na} k_{na})$$

Subject to the resource constraint:

$$l_a + l_{na} = 1$$
$$k_a + k_{na} = 1$$

Rewriting the maximization by substituting the resource constraints gives:

$$\max p_a f_a(1 - k_{na}, l_{na}, e) - [w_a(1 - l_{na}) + r_a(1 - k_{na}) + p_{na} f_{na}(k_{na}, l_{na}, e) - (w_{na} l_{na} + r_{na} k_{na})$$

Solving the problem yields the optimal choice $l_{na}^* \text{ and } k_{na}^*$. The optimal solution has not taken into account that households are restricted to making optimal choices. As in section 3, we impose another two resource constraints to capture this idea:

$$0 < l_{na} < l_{na}^*$$
$$0 < k_{na} < k_{na}^*$$

Using Lagrangean method, we rewrite the problem as:

$$L = p_a f_a(1 - k_{na}, l_{na}, e) - [w_a(1 - l_{na}) + r_a(1 - k_{na}) + p_{na} f_{na}(k_{na}, l_{na}, e) - (w_{na} l_{na} + r_{na} k_{na}) + \lambda(l_{na}^* - l_{na}) + \mu(k_{na}^* - k_{na})$$

Where the multipliers μ and λ are referred to shadow prices. They are equal to zero if choices are made at the optimum (i.e., no compensation is allowed to a small deviation from the optimal choices). In contrast, they are strictly positive if choices are made below the optimum. Keeping this in mind, the Complementary Slackness Conditions that characterize the economy are given by:

$$(l_{na}^* - l_{na}) \frac{\partial L}{\partial l_{na}} = (l_{na}^* - l_{na})[(p_{na} f_{na}^l - p_a f_a^l + w_a - w_{na}) - \lambda] = 0$$
$$(k_{na}^* - k) \frac{\partial L}{\partial k_{na}} = (k_{na}^* - k_{na})[(p_{na} f_{na}^k - p_a f_a^k + r_a - r_{na}) - \mu] = 0$$

That the first terms $l_{na}^* - l_{na}$ and $k_{na}^* - k_{na}$ are positive under assumptions, implying:

$$p_{na} f_{na}^l - p_a f_a^l + w_a - w_{na} = \lambda > 0$$
$$p_{na} f_{na}^k - p_a f_a^k + r_a - r_{na} = \mu > 0$$

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